REMARKS

1. The Amendments and the Support Therefor

No claims have been canceled, 20 new claims (31-50) have been added, and no claims have been amended to leave claims 1-50 in the application. Please note that claim 9 has been reintroduced for the reasons set forth in Section 2 of the last Response (i.e., since claim 9 was subject to election of species, it should not be withdrawn until its parent claim 1 is finally rejected, as per MPEP 809.02 / 37 CFR 1.146). A PTO-2038 for any newly-submitted claims in excess of the amount previously paid for should accompany this Response, as per 37 CFR §1.16(b)-(d), with the fee due being calculated as follows:

FEE CALCULATION

For	Already Paid	No. Extra	Rate (SMALL ENTITY)	Fee (SMALL ENTITY)
Total Claims	50 - 30 =	20	x $9 =	$180
Independent Claims	5 - 4 =	1	x $44 =	$44
			Total:	$224

No new matter has been added by the new claims, which are discussed in greater detail at Section 7 of this Response.

2. Section 1 of the Office Action: Rejection of Claims 1-5, 7-8, and 10-11 under 35 USC §112(1) for Enablement

Kindly reconsider these rejections, which are predicated on the basis that "[a] claim which omits matter disclosed to be essential to the invention as described in the specification or in other statements of record may be rejected under 35 U.S.C. 112, first paragraph, as not enabling,"[1] and "the claims do not show how the first and second delay line anodes are used or structured to detect particles." However, as MPEP 2163, 2164.08(c), 2172.01, and 2174 discuss, a rejection on this basis relates to claims which fail to recite *structure or method steps* which are described in the specification as being critical to the invention. Here, the rejected claims recite delay line anodes, which are by their very definition used to detect particles: this is what a delay line anode does.

[1] See MPEP 2172.01; also MPEP 2164.08(c), 2174, and 2163, all of which discuss *In re Mayhew*, 188 USPQ 356, 358 (CCPA 1976), cited by the Examiner.

Thus, contrary to the rejection, the claims intrinsically "show how the first and second delay line anodes are used or structured to detect particles." Note that the cited *Mayhew* case does not apply to the present situation because it related to a situation wherein a claimed method omitted a step which was so essential, the claimed method was plainly inoperative without it. See the summary of *Mayhew* in MPEP 2174:

> In *Mayhew*, the examiner argued that the only mode of operation of the process disclosed in the specification involved the use of a cooling zone at a particular location in the processing cycle. The claims were rejected because they failed to specify either a cooling step or the location of the step in the process. The court was convinced that the cooling bath and its location were essential, and held that claims which failed to recite the use of a cooling zone, specifically located, were not supported by an enabling disclosure (35 U.S.C. 112, first paragraph).

See also the summary of *Mayhew* given in *Amgen Inc. v. Hoechst Marion Roussel Inc.*, 65 USPQ2d 1385, 1402 (Fed. Cir. 2003): "There, however, the method claims *omitted a step without which the invention as claimed was wholly inoperative* (meaning it simply would not work and could not produce the claimed product)." (Emphasis added.)

However, the claims rejected here *do* recite an operative invention: they recite "[a] particle detector comprising first and second delay line anodes," and since delay line anodes detect particles, the claimed structure is plainly operative. To illustrate, note MPEP 2164.08(c):

> [A]n enablement rejection based on the grounds that a disclosed critical limitation is missing from a claim should be made only when the language of the specification makes it clear that the limitation is critical for the invention to function as intended. Broad language in the disclosure, including the abstract, omitting an allegedly critical feature, tends to rebut the argument of criticality.

Then note, for example, page 1 line 16 of the applicant's specification:

> Delay line anodes are apparata used in time- and/or position-sensitive detectors to encode the time and position of impact of particles (e.g., electrons, atoms, ions, molecular complexes, etc.) and/or photons incident upon the detector.

As another example, note page 2 lines 17-21:

> The electron cloud **104** generated by the EAD **106** is then driven via a bias voltage to one or more delay line anodes, with two such anodes being depicted in **FIG. 1** by upper delay line anode **108** and lower delay line anode **110**, for encoding of the time and position of impact of the electron cloud **104** on the delay line anode(s).

Thus, contrary to the rejection, it is evident from the specification how the claimed "first and second delay line anodes are used or structured to detect particles." The claims and specification fulfill the requirements of MPEP 2164.08(c), since there is "broad language in the disclosure .... omitting [the] allegedly critical feature", and thus the claims fully meet the requirements of §112(1).

Further, note that a §112(1) enablement rejection relates to a failure *of the specification* to describe how to make and use the claimed invention,[2] and here the specification describes in great detail how to make and use the matter in the rejected claims. It is therefore submitted that the matter of claims 1-5, 7-8, and 10-11 is fully enabled, and the rejections should be withdrawn.

3. Section 2 of the Office Action: Rejection of Claims 1-5, 7-8, and 10-11 under 35 USC §112(2) for Omission of Essential Elements (Particle Detection)

These rejections, which assert that the claims fail to distinctly claim what the Applicants regard to be their invention (see MPEP 2172.01), should be withdrawn for largely the same reasons set forth in the foregoing Section 2 of this Response: the claims do indeed recite structure which detects particles. These rejections appear to suggest that the claims, to be definite, should recite further structure. However, all that §112(2) requires is that one of ordinary skill must, upon reading the claims, be able to tell what infringes and what does not. As noted by the Court of Appeals for the Federal Circuit in *Miles Laboratories Inc. v. Shandon Inc.*, 27 USPQ2d 1123, 1126 (Fed. Cir. 1993):

> The "distinctly claiming" requirement [of 35 USC §112(2)] means that the claims must have a clear and definite meaning when construed in the light of the complete patent document. ... Section 112 thus ensures definiteness of claim language. ... The test for definiteness is whether one skilled in the art would understand the bounds of the claim when read in light of the specification. ... If the claims read in light of the specification reasonably apprise those skilled in the art of the scope of the invention, Section 112 demands no more.

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[2] Note MPEP 2163, at the close of part I: "The fundamental factual inquiry [for a §112(1) enablement rejection] is whether the specification conveys with reasonable clarity to those skilled in the art that, as of the filing date sought, applicant was in possession of the invention as now claimed."

(Citations omitted.) Here, the rejected claims plainly meet this standard: an ordinary artisan can tell what falls within the claims, and what does not.

Also note that neither §112(2), nor any other provisions of the patent laws, require that the claims recite the structure of the invention in any greater detail. See, e.g., *Carl Zeiss Stiftung v. Renishaw plc*, 20 USPQ2d 1094, 1101 (Fed. Cir. 1991):

> It has long been held, and we today reaffirm, that it is entirely consistent with the claim definiteness requirement of the second paragraph of section 112, to present "subcombination" claims, drawn to only one aspect or combination of elements of an invention that has utility separate and apart from other aspects of the invention. As one of our predecessor courts stated, "it is not necessary that a claim recite each and every element needed for the practical utilization of the claimed subject matter," as it is "entirely appropriate, and consistent with §112, to present claims to only [one] aspect." *Bendix Corp. v. United States*, 600 F.2d 1364, 1369, 220 Ct. Cl. 507, 514, 204 USPQ 617, 621 (1979).

Also see *Reiffin v. Microsoft Corp.*, 54 USPQ2d 1915, 1918 (Fed. Cir. 2000):

> Section 112 Para.2 instructs the applicant to "distinctly claim [] the subject matter which the applicant regards as his invention." This does not automatically require inclusion in every claim of every element that is part of the device or its operation. ....
>
> While the specification must of course describe the claimed invention, it is well established that the claims need not include every component that is described in the specification. See *Aro Mfg. Co. v. Convertible Top Replacement Co.*, 365 U.S. 336, 345 [128 USPQ 354] (1961) (There is "no legally recognizable or protected 'essential' element . . . in a combination patent."). . . .
>
> When the claim is supported by the patent's disclosure, is adequately distinguished from the prior art, and otherwise meets the statutory requirements of patentability, neither law nor policy requires that the claim contain all the elements described in the specification as part of the new machine or method.

Thus, the claims are submitted to be in agreement with §112(2) since they recite apparatus which performs particle detection (and they do so in a readily understandable manner), and the foregoing cases show that the claims need not recite more structure in order to meet the standards of §112(2).

4. Section 2 of the Office Action: Rejection of Claims 1-8, and 10-12 and 26-27 under 35 USC §112(2) for Omission of Essential Elements (Means for Adjusting Space Between Anodes)

These rejections should be withdrawn for the bases noted in the foregoing Section 3 of this Response. The rejection states that the claims lack the essential element of a "means for adjusting the space between the delay line anodes." However, the claims (more specifically, independent claim 1) recites that the anodes are "adaptably mounted in spaced relation to have adjustable spacing therebetween." Thus, adjustable spacing is *functionally* recited, which is permissible in accordance with MPEP 2173.05(g).

Further, as per the *Carl Zeiss Stiftung v. Renishaw plc* and *Reiffin v. Microsoft Corp.* cases noted in the foregoing Section 3 of this Response, there is no basis in the patent laws for requiring that any specific means for adjusting space be recited. As noted in the *Reiffin* case, "[w]hen the claim is supported by the patent's disclosure, is adequately distinguished from the prior art, and otherwise meets the statutory requirements of patentability, neither law nor policy requires that the claim contain all the elements described in the specification as part of the new machine or method."

5. Section 4 of the Office Action: Rejection of Claims 24 and 28 USC §102(b) view of U.S. Patent 3,581,091 to *Meijer*

Kindly reconsider these rejections. *Meijer*'s two discs 2 and 5 are not in fact delay lines, and rather they are each counters/detectors which directly measure the hit location of incident particles (and by the use of the two counters/detectors 2 and 5 in combination, the angle of incidence of particles can be determined). As discussed in the applicant's specification and in the last Response, a "delay line" is an art-recognized device which identifies particle hits by determining the time it takes for their signal to travel down a line.[3] *Meijer*'s two discs 2 and 5,

[3] See also, for example, Dictionary.com (http://dictionary.reference.com/), which defines a "delay line" (more specifically "electromagnetic delay line") as "a delay line based on the time of propagation of electromagnetic waves."

either considered alone or together, are not delay lines. This can be seen from a review of U.S. Patent 3,529,161 to *Oosthoek et al.*, which discusses the basic structure of each of *Meijer*'s discs 2 and 5 (see *Meijer* at column 1 lines 64-67, which notes that the *Oosthoek et al.* application describes the discs). Looking to *Oosthoek et al.*:

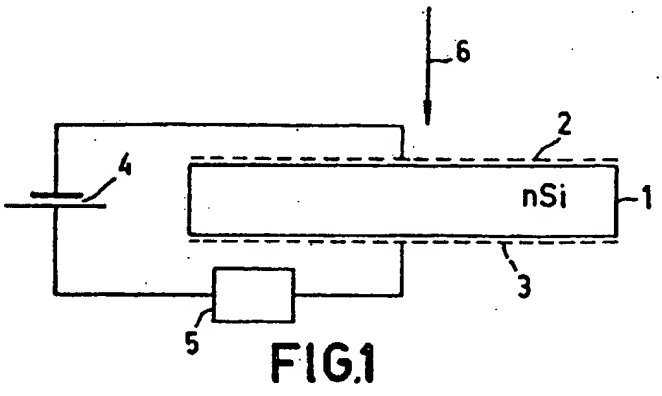

FIG.1

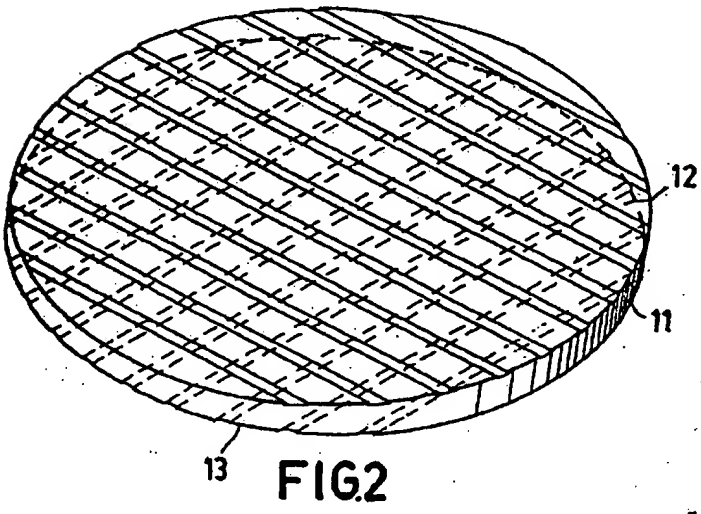

FIG.2

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The invention relates to a semiconductor device for detecting and/or measuring radiation, particularly radiation of charged particles, said device comprising a single-crystal disc of semiconductor material, one of whose major faces is provided with an electrode of rectifying nature, whereas the other face has an electrode of ohmic nature. Such a device, hereinafter termed a radiation detector, is, in general, intended for connection by its electrodes to such a voltage that the depletion layer formed at the rectifying electrode occupies substantially the whole space between the electrodes, said detector being arranged in the path(s) of the radiation to be detected so that it is incident to the disc approximately at right angles. When the detector is struck, for example, by a particle, the latter will give off a certain amount of energy, while the charge released in the form of electrons and holes can be measured as a pulse in the circuit connected to the electrodes.

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According to the invention, a semiconductor device for detecting and/or measuring radiation of the kind described in the preamble is characterized in that the two major faces of the disc have each a plurality of parallel, strip-shaped relatively insulated electrodes, the strips on one side of the disc crossing the strips on the other side of the disc. At each crossing of the strip-shaped electrodes a detector of the known type described above is formed and in operation these detectors are insulated from each other by applying between the electrodes of these detectors a voltage commonly used for such detectors so

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that a depletion layer is formed, which occupies approximately the whole space between the electrodes, the electrodes of ohmic nature being thus insulated from each other. The electrodes of rectifying nature are insulated from each other by their very nature. The device according to the invention is capable of registering at which place, for example, a particle strikes the disc, since the pulse produced at the impact appears only in the strip-shaped electrodes crossing each other at the point of impact.

Further details can be found at column 2 line 55-column 3 line 34:

The particle detector shown in FIG. 1 comprises a single crystal disc, preferably of a semiconductor material of diamond structure, for example germanium and silicon. It should be noted that the term "diamond structure" in this case has to denote not only crystals having only one type of atom, but also crystals having two types of atoms, as for example in the zinc blende structure or more than two atom types. In the present case the disc 1 consists of n-type silicon of a resistivity of the order of 5000 ohm cm. The disc may have a diameter of about 25 mm. and a thickness of, for example 25 to 300 μ. To the upper side an electrode 2 of pure gold is applied by vapour deposition; this electrode is shown in broken lines; the lower side is provided by vapour deposition with an electrode 3 of pure aluminum, also indicated in broken lines. The gold electrode on the very high-ohmic silicon forms a Schottky junction, while the electrode 3 is of the

ohmic type. To these electrodes is connected a circuit including a voltage source 4, the voltage of which is adjusted so that the depletion layer at the electrode 2 occupies substantially the whole space between the electrodes. The circuit furthermore includes a measuring device 5 for counting and/or analysing the pulses produced at the incidence of charged particles, for example α particles, deuterons and protons, which are incident to the electrode 2 in the direction of the arrow 6 and penetrate into the disc 1.

According to the invention, the electrodes 2 and 3 are subdivided into a plurality of parallel strips 12 and 13 respectively (see FIG. 2), the strips 12 crossing the strips 13. The semiconductor disc in FIG. 2 is designated by 11. The strips 12 and 13 are insulated from each other by non-covered paths.

The strip-shaped electrodes may be applied by vapour deposition and during the vapour-deposition process a grating of parallel metal wires is disposed on the disc, while the source of metal to be evaporated is formed by a wire extending parallel to the wires of the grating and stretched above them at a given distance.

The strips 12 are of gold and the strips 13 are of aluminum.

Between the strips 12 and 13 a voltage can be applied so that the depletion layer occupies approximately the whole space between the electrodes. The strips of the upper and lower sides may be connected to a measuring device (not shown).

Apart from supplying other information the measuring device is capable of registering at which place a particle strikes the disc, since the pulse produced at this impact appears only in those strips 12 and 13 which cross each other at the point of impact.

Thus, each of *Oosthoek et al.*'s (and *Meijer*'s) discs consists of charged semiconductor material with *separate spaced conductive strips* on its opposing sides, such that when a particle hits, the strips on the opposing sides which are closest to the hit will give a signal, and thereby identify the location of the hit (as the crossing of the opposing strips). The *Oosthoek/Meijer* counters/detectors therefore do not anticipate claim 24 since they do not include any matter which provides or measures delay, such as the meanders (serpentine leads zig-zagging about an area) noted in the references of the last Office Action: the conductive strips on the opposite sides of each of the *Oosthoek/Meijer* counters/detectors 2 and 5 simply locate hits, and no delay is created or measured, and thus the counters/detectors 2 and 5 are not "delay line anodes." It is also in no way obvious to somehow modify *Meijer*'s counters/detectors 2 and 5 to function as delay line anodes: it is not feasible to measure delay on either counter/detector 2 or 5 owing to the short

length of each of the conductive strips – they are so short that no significant delay could be measured. Also, owing to the fact that there are numerous such strips of different lengths, delay measurement would be extremely complicated and expensive to implement, particularly since the strips have different lengths, and would thus have different delays, and would therefore need different time calibration.

Further, the *Oosthoek/Meijer* counters/detectors do not anticipate claim 28. Even if the strips of the layers 4 and 7 were regarded to be ground layers (i.e., at some datum potential), the intermediate layers 2 and 5 between the strip layers 3/4 and 6/7 are not dielectric, but are rather made of semiconductor material.[4] Note from the foregoing passages of *Oosthoek* that the *Oosthoek/Meijer* counters/detectors *require* the use of a semiconductor layer to form the depletion zone between the opposing strips – a dielectric would not work. Thus, the matter of claim 28 is unobvious as well.

6. Section 4 of the Office Action: Allowance of Claims 13-23 and 30

The indication that claims 13-23 and 30 are allowable, and that claim 29 would be allowable if rewritten in independent form, is noted and appreciated.

7. New Claims 31-50

The following new claims all depend from allowed claim 30, and should be allowable for at least the same reasons as allowed claim 30:

- New claim 31 finds support in original claim 1;
- New claim 32 finds support in original claim 4;
- New claim 33 finds support in original claim 5;
- New claim 34 finds support in original claim 6;

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[4] Again note (for example) Dictionary.com (http://dictionary.reference.com/) for a definition of "dielectric" ("A nonconductor of electricity, especially a substance with electrical conductivity of less than a millionth (10-6) of a siemens") and "semiconductor" ("Any of various solid crystalline substances, such as germanium or silicon, having electrical conductivity greater than insulators but less than good conductors, and used especially as a base material for computer chips and other electronic devices").

- New claim 35 finds support in original claim 9;
- New claim 36 finds support in original claim 10;
- New claim 37 finds support in original claim 11; and
- New claim 38 finds support in original claim 12.

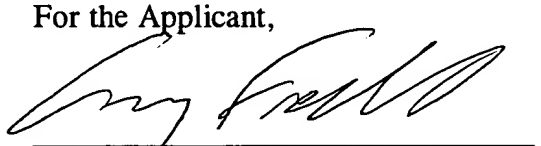
New independent claim 39 finds support in claims 1 and claim 30, and should be allowable for at least the same reasons as claims 1 and 30. New claims 40-50 depend from claim 39:

- New claim 40 finds support in original claim 4;
- New claim 41 finds support in original claim 5;
- New claim 42 finds support in original claim 6;
- New claim 43 finds support in original claim 9;
- New claim 44 finds support in original claim 10;
- New claim 45 finds support in original claim 11;
- New claim 46 finds support in original claim 12;
- New claims 48 and 49 find support in original claim 2; and
- New claim 50 finds support in original claim 8.

8. In Closing

If any questions regarding the application arise, please contact the undersigned attorney. Telephone calls related to this application are welcomed and encouraged. The Commissioner is authorized to charge any fees or credit any overpayments relating to this application to deposit account number 18-2055.

For the Applicant,



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ATTACHMENTS:

- PTO-2038 ($224)